

What is claimed is:

- 1     1.    In microcontact printing wherein an electronic circuitry pattern on the surface of an  
2       elastomeric stamp member is operable in a transfer of a further processing responsive  
3       material, to a surface of a substrate,  
4       the improvement comprising:  
5       said elastomeric stamp member having a surface region of a material imparting to said  
6       stamp member at least one of the properties of adhesion and wettability enhancement  
7       of the material of said circuitry pattern to said surface region, and,  
8       said elastomeric stamp member further having at least one subsurface region, each said  
9       subsurface region being of a material imparting a particular physical property to said  
10      stamp member.
- 1     2.    The microcontact improvement of claim 1 wherein said at least one subsurface  
2       region, is a single region that imparts the bulk property of stiffness to said stamp  
3       member.
- 1     3.    The microcontact improvement of claim 1 wherein said at least one subsurface  
2       region, is a single region that imparts the bulk property of wettability enhancement to said  
3       stamp member.
- 1     4.    The microcontact printing improvement of claim 2 wherein another region of said at  
2       least one subsurface regions, imparts the property of porosity, and is positioned between  
3       said surface region and said stiffness bulk property imparting region.

1     5.     The microcontact printing improvement of claim 2 wherein another region of said at  
2     least one subsurface regions, imparts the property of porosity, and is positioned between  
3     said surface region and said wettability enhancement bulk property imparting region.

1     6 .The microcontact printing improvement of claim 2 wherein said surface region is of the  
2     material known as Dupont Sylgard siloxane 184 and said subsurface region is of the  
3     material known as Dupont Sylgard siloxane 186.

1     7.     A microcontact printing stamp,  
2     comprising in combination :  
3     a body having at least a layer imparting a bulk stiffness and flatness physical property on  
4     which there is a stamping pattern supporting surface,  
5     a stamping pattern layer positioned on said pattern supporting surface of said body,  
6     said stamping pattern layer including a negative relief stamping pattern in which the  
7     spaces between the features of said stamping pattern are the positive relief embossed  
8     portions of the final printing stamp,  
9     said stamping pattern layer further being of an electronic circuitry processable material  
10     in which at least one of the physical properties of adhesion enhancement and  
11     wettability enhancement are imparted.

1     8.     The microcontact printing stamp member of claim 7 including a further layer  
2     of a specific physical property imparting material positioned between said stamping  
3     pattern layer and said layer of bulk stiffness and wettability enhancement physical

4 property imparting material.

1 9. The microcontact printing stamp member of claim 8 wherein said physical property  
2 imparted by said layer of a specific physical property imparting material is the physical  
3 property of porosity.

1 10. The microcontact printing stamp of claim 7 wherein said layer of a bulk stiffness and  
2 wettability enhancement physical property imparting material, is the material known as  
3 Dupont Sylgard siloxane 186 and the material of said stamping pattern layer is of the  
4 material known as Dupont Sylgard siloxane 184.

1 11. The fabrication process of a microcontact printing stamp member ,  
2 comprising in combination the steps of :  
3 providing a conductor pattern member, having first and second parallel surfaces,  
4 said pattern member material between said first and second surfaces, being  
5 comprised of a negative relief of a conductor correlatable  
6 configuration of elements of a material processable into electronic circuitry,  
7 said negative relief of a conductor correlatable configuration of elements having  
8 an adhesion enhancing material interspersed between conductor portions,  
8 positioning said first surface of said pattern member on a processing substrate  
9 providing a body portion including at least a layer of a stiffness enhancing material on said  
10 second surface of said pattern member,  
11 separating said conductor pattern member from said processing substrate along the  
12 interface of said first surface of said pattern member and said processing substrate,

13 etching out the negative relief portions out of said pattern member leaving a positive relief  
14 of said conductor correlatable configuration.

1 12. The process of claim 11 wherein said step of providing a body portion is performed by  
2 an injection operation in a mold.

1 13. The process of claim 12 wherein said adhesion enhancing material is the  
2 material known as Dupont Sylgard siloxane 184.

1 14. The process of claim 13 wherein said layer of stiffness enhancing material is the  
2 material known as Dupont Sylgard siloxane 186.

1 15. The process of claim 14 including a partial curing step of the adhesion enhancing and  
2 the stiffness enhancing materials prior to the separation step.